

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) CLEANING DEVICE FOR THRESHING MACHINES AND COMBINE HARVESTERS

(71) We, DEERE & COMPANY, a body corporate organised under the laws of the State of Delaware, United States of America, of Moline, Illinois, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to cleaning devices, particularly for threshing machines and combine harvesters.

In the past, a support has often been provided only on the side walls of each of the cleaning devices in threshing machines and combine harvesters. The disadvantage of this is that fractures of the frames of the sieves within the cleaning device often occur, particularly in the case of wide sieves.

The present invention seeks to avoid fractures of the sieve frames by means of a more advantageous arrangement of the supports for the sieves.

According to the present invention, we provide a cleaning device for threshing machines or combine harvesters in which support devices for the sieves of the cleaning device are connected to the walls of the cleaning device and disposed both longitudinally and transversely of the cleaning device, the longitudinal support devices being formed by profiled bar sections disposed on the inside of the sidewalls of the cleaning device and the transverse support devices are formed by profiled bar sections connecting the sidewalls. In this way each sieve is supported on all four sides, so that the carrying capacity of the sieves is increased and fractures of the sieve frame are largely avoided. Because the sieve is supported on four sides, the sieve frame can be made less deep and consequently lighter and is inexpensive to manufacture. It is also possible, for example, for wide sieves to be sub-divided into individual sieves which together are nevertheless provided with support on three or four sides. This arrangement is simple in construction and as a whole provides a rigid construction.

[Price 25p]

The longitudinally extending support devices may be formed by angle section bars joined to the side walls of the cleaning device to form hollow sections. This construction is preferable inasmuch as the hollow sections provide increased rigidity for the side walls of the cleaning device. The transversely extending support devices may be formed at one end by U-section bars receiving the respective sieve end in a detachable manner, and at the other end by U-section bars which are angularly offset in relation to the first-mentioned U-section bars and on the web of which the sieve ends rest, the sieves being detachably connected thereto.

In order to facilitate changing of sieves, it is preferred that the bar sections forming the transverse devices should be detachably connected to the side walls of the cleaning device. To change the sieves it is then merely necessary for one of the transversely extending sieve supports to be removed and to be re-connected to the side walls after the sieves have been installed.

Preferably, the cleaning device has two superimposed sieves, for example an upper short straw sieve and a lower grain sieve and the longitudinally extending support devices for the lower sieve are disposed inwardly of the similar support devices for the upper sieve and the lower sieve is made correspondingly narrower than the upper sieve, while the transversely extending support devices of the lower sieve are at one end offset by the width of the similar support device of the upper sieve in the direction of the opposite sieve end, and the lower sieve is made correspondingly shorter than the upper sieve. In this way it is possible for both sieves to be inserted from above into the cleaning device without one of the transversely extending sieve supports needing to be removed. The slight reduction of the sieve surface of the bottom sieve does not matter.

Preferably also the bar sections forming the transversely extending support devices are connected, by lattice-like members which extend in a serpentine-like or zig-zag manner between

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the bar sections, with which they form a unit. This construction enables the sections forming the transversely extending support devices to be so constructed that not only do they form with the connecting members a rigid lattice girder with top and bottom chords, which can be manufactured by lightweight construction methods, but also, the transversely extending support devices do not obstruct the admission of the cleaning air into the cleaning device.

A preferred embodiment of the invention is now described with reference to the accompanying drawing, in which:—

Figure 1 is a longitudinal section through a cleaning device and cleaning blower, and

Figure 2 a cross-section along the line II—II in Figure 1.

Referring to the drawing, the cleaning device is in the form of a box, and has two side walls 10 and 11, a short straw sieve 12, a grain sieve 13, and a stepped return bottom wall 14. A blower 15 supplies cleaning air to the sieves 12 and 13 and the device is movable in the threshing machine or combine harvester.

In order to provide the sieves 12 and 13 with support on all four sides, two angle section bars 16, 17, and 18, 19 respectively, advantageously made of sheet metal, are connected, advantageously, by welding, to the inside of the side walls 10 and 11, also preferably made of sheet metal and together with the side walls form a box section, thereby stiffening the side walls. The horizontal surfaces 20, 21 and 22, 23 respectively, of the angle section bars form horizontal supports for the sieves 12 and 13, the grain sieve 13 being narrower than the short straw sieve 12, by an amount equal approximately to the width of the hollow sections, (see Figure 2). A transverse sieve support is formed at the lower end, by two U-section bars 25 and 26, which are made of sheet metal and are welded to, and connect the side walls 10 and 11, and a transverse support for the sieves at the opposite end of the cleaning device is provided by two U-shaped sheet metal bar sections 27 and 28. The bottom section 28 is slightly offset in the direction of the blower 15 in relation to the upper section. The superimposed bar sections 25, 26 and 27, 28 respectively are braced by the lattice-like members 29 and 30, which are in the form of bars advantageously welded in position in a zig-zag or sinuous pattern to provide a lattice girder arrangement, and do not obstruct the passage of blower air.

As can be seen from Figure 2, the sieves 12 and 13 are inserted end first into the sections 25 and 26 and rest on the surfaces 21, 23 and 20, 22 and on the web of the U-section bars 28 and 27. Since both sieves are inserted obliquely from above, the grain sieve 13 is made slightly shorter than the short straw sieve 12. The sieves 12 and 13 may be secured in position by means of clips 32 and 33, which embrace the

ends of the sieves and are provided at the bottom with bent-over portions 34 and 35 respectively, which engage behind one arm of the respective U-section bars 27 or 28 and secure the sieves in the longitudinal direction.

The advantage of the above arrangement is that the sieves are fully supported on all sides, so that even if extremely wide their frames can be made less deep and robust and consequently lighter and less expensive than hitherto, and yet their carrying capacity will not be affected. The smaller the sieve frames, the greater the intensity with which the blower air can act on the sieves. The longitudinal and transverse supporting bar sections which join the side walls 10 and 11 together increase the strength of the entire cleaning device. Since the bar sections 25 to 28 are thin-walled and the lattice-like members 29 and 30 can be made of thin material, the resulting manufacturing expense is relatively small in comparison with the improvement provided through the substantial avoidance of sieve frame fractures.

Alternative embodiments to that described are possible. For example, the transversely extending sieve supports 25, 26 and 27, 28 respectively may be combined with the members 29 and 30 respectively by light-weight construction methods to form a lattice girder having top and bottom chords which are detachably connected to the side walls 10 and 11 of the cleaning device. This facilitates the replacement of the sieves, since at least one of the lattice girders is detachable, but after assembly to the side walls of the sieve box, it forms a rigid unit.

Moreover, in the above described constructions the sieves 12 and 13 need not necessarily be made in one piece, particularly if they are very wide but may be composed of several narrow sieves disposed parallel, side by side and supported and secured to the transversely extending sieve supports. The complete sieve assembled in this manner is nevertheless provided with support on all four sides.

WHAT WE CLAIM IS:—

1. A cleaning device for threshing machines or combine harvesters in which support devices for the sieves of the cleaning device are connected to the walls of the cleaning device and disposed both longitudinally and transversely of the cleaning device, the longitudinal support devices being formed by profiled bar sections disposed on the inside of the sidewalls of the cleaning device and the transverse support devices are formed by profiled bar sections connecting the sidewalls.

2. A cleaning device according to Claim 1 in which the longitudinal support devices are formed by angle section bars connected to the sidewalls of the cleaning device to form hollow sections.

3. A cleaning device according to Claim 1 or 2, in which the transverse support devices are formed at one end by U-section bars de-

the bar sections, with which they form a unit. This construction enables the sections forming the transversely extending support devices to be so constructed that not only do they form with the connecting members a rigid lattice girder with top and bottom chords, which can be manufactured by lightweight construction methods, but also, the transversely extending support devices do not obstruct the admission of the cleaning air into the cleaning device.

A preferred embodiment of the invention is now described with reference to the accompanying drawing, in which:—

Figure 1 is a longitudinal section through a cleaning device and cleaning blower, and

Figure 2 is a cross-section along the line II—II in Figure 1.

Referring to the drawing, the cleaning device is in the form of a box, and has two side walls 10 and 11, a short straw sieve 12, a grain sieve 13, and a stepped return bottom wall 14. A blower 15 supplies cleaning air to the sieves 12 and 13 and the device is movable in the threshing machine or combine harvester.

In order to provide the sieves 12 and 13 with support on all four sides, two angle section bars 16, 17, and 18, 19 respectively, advantageously made of sheet metal, are connected, advantageously, by welding, to the inside of the side walls 10 and 11, also preferably made of sheet metal and together with the side walls form a box section, thereby stiffening the side walls. The horizontal surfaces 20, 21 and 22, 23 respectively, of the angle section bars form horizontal supports for the sieves 12 and 13, the grain sieve 13 being narrower than the short straw sieve 12, by an amount equal approximately to the width of the hollow sections, (see Figure 2). A transverse sieve support is formed at the lower end, by two U-section bars 25 and 26, which are made of sheet metal and are welded to, and connect the side walls 10 and 11, and a transverse support for the sieves at the opposite end of the cleaning device is provided by two U-shaped sheet metal bar sections 27 and 28. The bottom section 28 is slightly offset in the direction of the blower 15 in relation to the upper section. The superimposed bar sections 25, 26 and 27, 28 respectively are braced by the lattice-like members 29 and 30, which are in the form of bars advantageously welded in position in a zig-zag or sinuous pattern to provide a lattice girder arrangement, and do not obstruct the passage of blower air.

As can be seen from Figure 2, the sieves 12 and 13 are inserted end first into the sections 25 and 26 and rest on the surfaces 21, 23 and 20, 22 and on the web of the U-section bars 28 and 27. Since both sieves are inserted obliquely from above, the grain sieve 13 is made slightly shorter than the short straw sieve 12. The sieves 12 and 13 may be secured in position by means of clips 32 and 33, which embrace the

ends of the sieves and are provided at the bottom with bent-over portions 34 and 35 respectively, which engage behind one arm of the respective U-section bars 27 or 28 and secure the sieves in the longitudinal direction.

The advantage of the above arrangement is that the sieves are fully supported on all sides, so that even if extremely wide their frames can be made less deep and robust and consequently lighter and less expensive than hitherto, and yet their carrying capacity will not be affected. The smaller the sieve frames, the greater the intensity with which the blower air can act on the sieves. The longitudinal and transverse supporting bar sections which join the side walls 10 and 11 together increase the strength of the entire cleaning device. Since the bar sections 25 to 28 are thin-walled and the lattice-like members 29 and 30 can be made of thin material, the resulting manufacturing expense is relatively small in comparison with the improvement provided through the substantial avoidance of sieve frame fractures.

Alternative embodiments to that described are possible. For example, the transversely extending sieve supports 25, 26 and 27, 28 respectively may be combined with the members 29 and 30 respectively by light-weight construction methods to form a lattice girder having top and bottom chords which are detachably connected to the side walls 10 and 11 of the cleaning device. This facilitates the replacement of the sieves, since at least one of the lattice girders is detachable, but after assembly to the side walls of the sieve box, it forms a rigid unit.

Moreover, in the above described constructions the sieves 12 and 13 need not necessarily be made in one piece, particularly if they are very wide but may be composed of several narrow sieves disposed parallel, side by side and supported and secured to the transversely extending sieve supports. The complete sieve assembled in this manner is nevertheless provided with support on all four sides.

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2. A cleaning device according to Claim 1 in which the longitudinal support devices are formed by angle section bars connected to the sidewalls of the cleaning device to form hollow sections.

3. A cleaning device according to Claim 1 or 2, in which the transverse support devices are formed at one end by U-section bars de-

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- tachably receiving a respective sieve end, and at the other end by U-section bars which are angularly offset in relation to the first-mentioned U-section bars and on the webs of which the other sieve end rests and in which the sieves are adapted to be detachably connected to the bars.
4. A cleaning device as claimed in any one of Claims 1—3, including two superimposed sieves, for example an upper short straw sieve and a lower grain sieve in which the longitudinally extending support devices of the lower sieve are disposed inwardly of the similar support devices of the upper sieve and in which the lower sieve is made correspondingly narrower than the upper sieve while the transversely extending support device of the lower sieve at one end is offset by the width of the similar support device of the upper sieve in the direction of the opposite end of the sieve, and the lower sieve is made correspondingly shorter than the upper sieve.
5. A cleaning device according to any one of the preceding claims, in which the transversely extending support devices are formed of bars connected by lattice-like members which extend back and forth between them and with which they form a unit.
6. A cleaning device substantially as hereinbefore described and as illustrated in the accompanying drawing.
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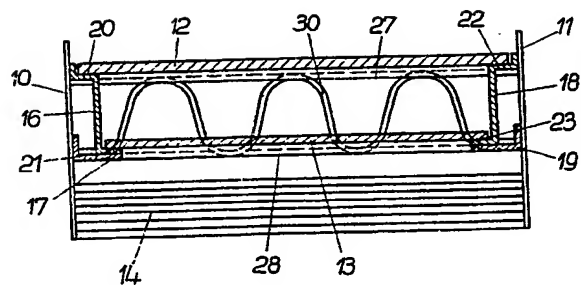


Fig. 2

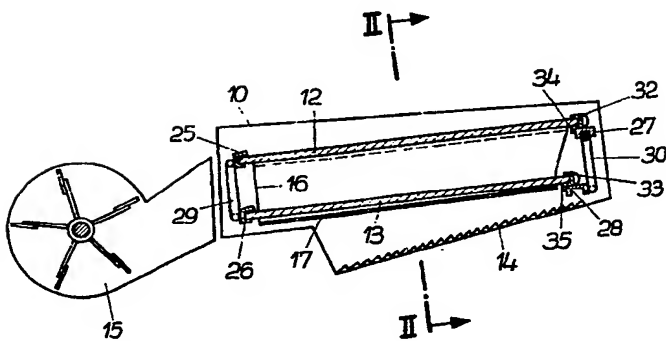
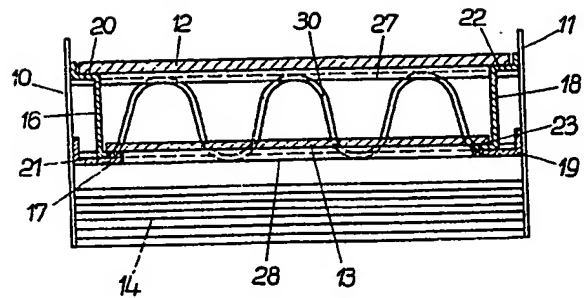
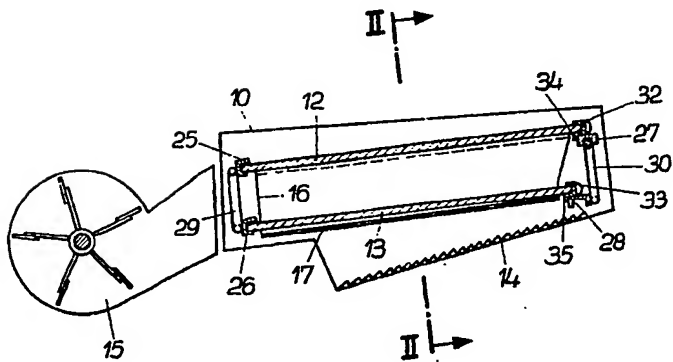


Fig. 1

*Fig. 2**Fig. 1*

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